Essay Review

New Straw for the Old Broom

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Jimena Canales, *The Physicist and the Philosopher: Einstein, Bergson, and the debate that changed our understanding of time*. Princeton University Press, Princeton, 2015, pp. viii+480, Price US$35.00 hardback, ISBN-13: 978-0-691-16534-9.

1. Introduction

Relativity is one of the most overfished streams in the history of science. Albert Einstein has doubtless graced the covers of more monographs than any other scientist—possibly save Charles Darwin—in the decade since the 2005 centenary of his *annus mirabilis*. I was skeptical that Jimena Canales would be able land new catch from such thoroughly exploited waters. *The physicist and the philosopher* proved that skepticism misplaced. By exploring a decades-long feud that pitted Albert Einstein against the French savant Henri Bergson, Canales shows how relativity intertwined with an intellectual context that has been roundly ignored by historians and philosophers of science and presents one of history's most iconic scientists in new light.

The debate in question contested the essence of time. For Einstein, time's intrinsic physical characteristics had nothing to do with the individual's fickle experience of it. Bergson championed the essential role of human experience in understanding "full-blooded" Time—a concept he capitalized to distinguish it from the physical variable *t*. Canales situates this debate in the center of both men's professional lives, as well as the European intelligentsia's understanding of relativity. The physicist and the philosopher contested not just the definition of time, but jurisdiction over it.

In making this case, Canales explores a dimension of the theory's reception absent from nearly all other historical treatments.

The novel contribution to Einstein studies is but one aspect of the book's significance. This review considers it both as a piece of historical scholarship and as an artifact of its context. *The Physicist and the Philosopher* is equal parts frustrating and impressive. As a crossover title, it struggles to balance the needs of popular and scholarly audiences and so leaves its most tantalizing lines of argument underdeveloped. At the same time, it uncovers an all-but-forgotten episode by bringing together a wide array of sources in a way that exemplifies how the technological reordering of historical sources enables new kinds of arguments. Just as much as the debate it describes, this book reflects the pressures of its time, providing a platform from which to raise critical questions about those pressures and to comment on what they augur for the practice of history and philosophy of science.

2. The book in overview

The Physicist and the Philosopher belongs to the long historiographical tradition examining the reception of relativity.[1] The extent of this literature is due not only to the conceptual importance of relativity or the celebrity of its architect, but also, as Andrew Warwick suggests in his study of special relativity's arrival at the Cavendish Laboratory, to its origin in one paper by a single author.[2] Relativity in its initial form was compact and, Warwick argues, was not a full-fledged theory that elicited *reactions*, but rather a provocative approach to longstanding problems that invited active *reinterpretations*. The physicists who populated an increasingly international community sought to integrate relativistic insights into practices that still exhibited considerable local variation. These characteristics have encouraged historians to use special relativity like a physicist might use a test particle, to map out the prevailing lines of conceptual, social, and ideological force in diverse intellectual, institutional, and national contexts.[3]

[1] Glick (1987) is the foundation of the genre. Notable examples of the extensive recent literature include Hu (2007), Wazeck (2008), and Mota, et al. (2009).
[2] Einstein (1905).
[3] Warwick (1991), p. 626. Richard Staley also notes the prevalence of the "inception/reception methodology" in Staley (2008), p. 296.

By examining the protracted dispute between Einstein and Bergson, Canales places this test particle in a field that historical treatments of relativity have roundly ignored—continental philosophy. I use the term anachronistically here; the now-familiar distinction between analytic and continental philosophy did not become widespread until after World War II.[4] Prickly definitional issues aside, it remains rare to find Bergson in histories of relativity. Where he appears at all, his views tend to be briskly dismissed, for example as obdurate vitalism,[5] or considered primarily for their role in souring the Nobel committee toward relativity.[6] Canales quotes the sentiment, evidently drawn from a pre-publication review, that the Einstein-Bergson tussle has been "deservedly forgotten" (p. 359). Defying this sentiment, she aims to rehabilitate Bergson's image as a serious thinker—on scientific as well as philosophical matters—who influenced both Einstein and the reception of his theory.[7] Following Warwick, implicitly if not explicitly, Canales emphasizes the critical reinterpretations of relativity initiated by Bergson and his allies. She argues, first, that the friction between Einstein and Bergson helped establish the intellectual divisions that shape scholarly discourse to this day, and second, that parrying the philosopher's attacks reinforced Einstein's own understanding of his best-known contribution to physics. The surprising claim is not that philosophical concerns imprinted themselves upon relativity and its reception—a point that has been made before[8]—but that the imprint owed just as much to voluptuous Bergsonism as to the hard-edged Vienna Circle positivists.

Two short sections frame the book. The first introduces the controversy and describes its stakes. Not merely squabbling over how to interpret a parameter in a new and provocative theory, the physicist and the philosopher wrangled over whose profession held authority over time. The question of what interpretations relativity permitted had implications for the cultural authority of both science and philosophy, which had only recently become distinct after centuries of unity in the form of natural philosophy. The two brief chapters of the closing section describe how Einstein and Bergson reflected on their protracted disagreement at the end of their respective lives.

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[4] For a historical overview of the analytic/continental distinction and its significance and difficulties, see Critchley (1997).
[5] Wazeck (2008), pp. 101-102.
[6] Topper (2013).
[7] In this sense, the book recalls Shapin & Schaffer (1986), which similarly resuscitates Thomas Hobbes's criticisms of Robert Boyle.
[8] E.g., Howard (2005), van Dongen (2010).

It is tempting to assume that the debate's absence from present-day histories of relativity betrays the totality of Bergson's defeat. Canales suggests that this interpretation is incomplete, invoking Einstein's acknowledgment that, however much he thought Bergson misguided, the philosopher's critiques stayed with him.

Two lengthy partitions between these bookends recount parallel interpretations of the Einstein-Bergson debate. In the first of these, which traces the contours of the disagreement within the intellectual and political context of interwar Europe, Canales toys with the dimensions of her own historical narrative. The story jumps in time and space around the 6 April 1922 meeting in Paris at which Einstein and Bergson publically aired their disagreements, preceding the publication later that year of Bergson's critique of relativity, *Duration and Simultaneity*. We learn how Einstein and Bergson settled into their positions against an intricate backdrop that includes the birth of logical empiricism, interwar internationalism, the rise of fascism and anti-Semitism in Germany, the confounding variable of quantum mechanics, and the Catholic church's reaction to the early-twentieth century revision of our basic understanding of the physical world. These sixteen peripatetic chapters attempt to overcome the perception, prevalent within both the contemporary scientific community and current historical discourse, that Bergson simply did not understand Einstein. This perception, Canales contends, precipitated the erosion of Bergson's once-unassailable reputation, contributing to the persistent belief that his critiques are of little interest.

The second major partition explores relativity's technological milieu. The steam engines and dynamos of the industrial revolution have long been understood as intertwined with the theoretical development of nineteenth-century thermodynamics and electromagnetism.[9] Relativity represented a more abstract phase of physics; it obviated the need for a mechanical ether and its effects lay beyond typical human experience. Peter Galison's study of relativity's technological context suggests that this supposedly more abstract approach nonetheless depended on *things*.[10] Canales proceeds in the same vein, describing how clocks, moving pictures, and sound recordings became ammunition for both sides of the feud. More accurate chronometers convinced scientists that they could impartially access abstract time. Films shaped understanding of reversibility in

[9] See Hunt (2010) for an overview of the relationship between nineteenth century science and technology. A detailed example is developed in Lazaroff-Puck (2015).
[10] Galison (2003).

physical law and irreversibility in the observed world. Recording devices redefined what it meant to be an observer. Canales uses the material culture of the era to engender sympathy for Bergson and to defend the role philosophy could play in such a context. She shows that each figure relied on technological examples to advance his position and suggests that Bergson was correct that the essential role of instrumentation in the language of relativity posed a genuine philosophical problem for Einstein's abstract conception of time. The newness of the early twentieth century's technological ecology raised questions about the type of access human beings could have to the architecture of the physical world and what we could conclude about it as a result.

The remainder of this review focuses on the book as an artifact of the present historical moment. The next section considers how the book balances popular and scholarly readership as a way to comment on some of its limitations. Section four treats it as a product of our own technological context as a way of highlighting its strengths and exposing the possibilities it makes evident. The conclusion illuminates on the book's importance in light of recent clashes between physics and philosophy.

3. Who is history for?

The Physicist and the Philosopher is pitched as a crossover title. It undertakes a serious intervention in the scholarly literature; however, for all its dalliances with the now recherché concerns of Bergsonian philosophy, it aims to remain accessible to popular audiences. Canales, with a fluid, readable style, answers calls for historians of science to transcend the strict dichotomy between "densely footnoted articles in flatfooted prose, bristling with new insights that will barely see the light of day [and] popular accounts of science that our colleagues will not respect as significant contributions to knowledge," as Paula Findlen eloquently puts it.[11] The book sometimes falters in the attempt to juggle the needs of general and scholarly audiences, with the result that it is likely to frustrate both.

The pressures at work are evident as early as the subtitle, *Einstein, Bergson, and the debate that changed our understanding of time*. It foretells a reductionist narrative, which, despite Canales's engagement with social, intellectual, political, and technological contexts, exerts discernible gravitational effects on the book's trajectory. The reader looking for the story of how one

[11] Findlen (2005), 236-7.

encounter between two intellectuals precipitated myriad changes in both science and the academy is free to extract it, and sometimes encouraged to do so. The tale of the great men who changed the world is seductive, especially when the men in question are engaged in the conference hall equivalent of a barroom brawl.

This, to be fair, is not the story that predominates for the more historically sensitive reader. The titular controversy was much larger than a disagreement between two men, and Einstein and Bergson were as much symptomatic of it as etiological. But the fuller picture of the debate as reflective of its context is obscured when the temptations of the more salable narrative prevail. Recent philosophical work, for example, situates Bergson's interactions with Einstein within a longer downward trajectory of the philosopher's reputation.[12] Canales recognizes that Bergson had been the target of attacks from the likes of Hans Reichenbach and Bertrand Russell before his encounter with Einstein, but too neatly presents the debate with Einstein as the proximate cause of Bergson's decline. Canales also overstates the case for the Einstein-Bergson encounter as a prime mover when she sells the book's importance as the story of a personal encounter that "opened up a veritable 'can of worms' that lasted for the next hundred years" (p. 15). Subsequent pages furnish ample evidence that the worms were loose well before Einstein and Bergson had cause to quarrel, but a richer engagement with that story, which a scholarly audience might desire, falls victim to the interests of a competing readership.

A second consequence of concessions to the popular palate is that explanations of the debate's conceptual content stop short of the level of detail that might intimidate a lay reader leafing through a display copy. The particulars of both the scientific and philosophical concepts at issue are often imprecise. In recounting one of relativity's most powerful successes, resolving the anomalous advance of the perihelion of Mercury, Canales explains: "According to Newtonian theory, Mercury's perihelion should advance by approximately 600", but observations fell short of that number" (p. 174). This explanation will likely remain opaque to anyone unaware that the relevant measure is seconds of arc *per century*—that is, the planet's closest approach to the sun undergoes a set angular displacement per every 100 orbital revolutions.[13] This example is minor, but symptomatic of a more pervasive tendency to gloss over the bedeviled details.

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[12] Guerlac (2006).
[13] See Earman & Janssen (1993).

Cursory treatments of both the physics and the philosophy make it difficult to evaluate some critical premises. Much of the dialogue between Einstein and Bergson involved competing interpretations of the twin paradox, Paul Langevin's famed observation that an observer who completed a round trip on a relativistic rocket ship would have aged less than an earthbound twin. It is essential to Canales's argument that Bergson understood the paradox fully and argued accordingly—not just in terms of special relativity, for which Langevin originally proposed it, but as a problem in general relativity, which was how Einstein had cast it by the early 1920s.[14] Special relativity, restricted to inertially moving frames, could not accommodate the acceleration required for a traveler to return to Earth.

In 1953, Bergson's bulldog, Édouard Le Roy, penned a letter to Rose-Marie Mossé-Bastide, who was completing a doctoral thesis on Bergson.[15] His letter, reprinted as the preface to the seventh edition of *Duration and simultaneity*, recounted Bergson's conviction "that the defective state of his knowledge of mathematics did not allow him to follow the development of generalized relativity in the detail such a development required" and cited this as the reason Bergson allowed the his principle critique of Einstein to fall out of print after the sixth edition of 1931.[16] Bergson's evident discomfort with the mathematics of the general theory challenges the premise that he was a fully competent interlocutor. Canales notes that his focus was limited to special relativity, and that he recognized both the role of acceleration in the twin paradox and the need for a generalized version of the theory, but skirts the question of how his lack of proficiency with general relativity as it stood at the time of his 1922 meeting with Einstein colors his critique.

More problematic than imprecise descriptions of the physics are the sometimes-cursory reconstructions of the relevant philosophical positions. Bergson, a veritable unknown next to Einstein, begins at a disadvantage with modern audiences. Canales allows that Bergson's illiteracy in the formalism of general relativity constituted his main weakness, but qualifies: "the philosopher expanded his work to account for the problem of acceleration. Yet his clarifications on this topic were largely ignored. Because Bergson was largely considered to have been 'mistaken,' readers forgot one of his central messages: that philosophy had the right to study the processes that

[14] See Janssen (2012).
[15] Later published as Mossé-Bastide (1955).
[16] Bergson (1968); translated in Lawlor & Leonard (2013).

lead us to infer certain conclusions from directly ascertainable (yet limited) observations, in science and in general" (p. 66). We do not, however, get a description of how acceleration figured into Bergson's interpretation and how we should therefore understand his position with respect to general relativity. Even a reader sympathetic to the claim that philosophy should not be frozen out of such discussions is left floundering without the means to assess the substance of Bergson's stance.

To assuage such concerns, the book appeals to the authority of Einstein himself. He clearly cared about Bergson's critique, which he discussed in detail with his close confidants. We are invited to believe that he did so because Bergson grasped something substantive about the science. This is an interesting possibility, but it is not adequately demonstrated here, especially given the host of other reasons Einstein had to care that an influential philosopher, a fellow Jew, and an potential political ally in a troubled Europe so directly attacked his conclusions. Canales shows that some of these factors are individually insufficient to account for Einstein's reaction, but even in aggregate those refutations do not prove the premise. The book's most intriguing possibility, that Bergson's objections influenced Einstein's own thinking about his theory, is thereby sold short by inadequate support from the nuanced physical and philosophical concepts in play.

The result of Canales's attempts to keep her analysis of subtle and technical disagreements palatable to a range of readers is twofold. First, audiences not already versed in the relevant physics and philosophy are left with incomplete reconstructions of details that very much mattered to the interlocutors themselves. Because readers learn a great deal about how Einstein reacted to Bergson's position but get only a taste of the position itself, the committed acolytes of science who comprise the likely non-professional readership are unlikely to be convinced that Bergson's position is worth consideration. Second, scholarly readers are too often invited to take the author's most critical assumptions—such as the virtue of Bergson's philosophical stance—on faith or authority, and so will have difficulty evaluating the arguments.

These criticisms are not meant to suggest that historians should disavow engaging wider audiences, only that doing so requires striking a balance. The way this particular balance is struck has consequences for the way the argument unfolds. Once historians accept that bringing scholarly insights to wider audiences is necessary and desirable, we face the question of how engaging such audiences is likely to shape the construction of historical arguments, as they appear to have done

here. Those questions have largely been left to be worked out in practice. If, however, more historians begin working in the genre this book exemplifies, more conscious attention to them is warranted.

4. Technology and the material culture of history

When introducing the material culture of relativity, Canales makes an observation that applies just as well to the practice of history today: "As much as they resisted the very idea of 'technology,' neither Bergson nor Einstein were immune from living through the vast changes in the material culture of their era" (p. 243). Similarly vast changes are now occurring in the way historians confront source material. This book, while describing how such technological shifts shaped bygone eras, demonstrates how our own technological environment influences historical practice.

The Physicist and the Philosopher, like relativity, appears deceptively aloof from its technological context. Canales, by all indications, relies on traditional, time-honored, and decidedly low-tech interpretive techniques. Nevertheless, her analysis draws together sources in a way that presupposes the intricate technological infrastructure historians now rely upon to access both primary and secondary materials. Rapidly accessing sources that are available in full text online, or are digitally catalogued, constitutes a new capability, a difference in kind from the days when it was impossible to place sources in dialogue without traveling to distant libraries, wearing out one's welcome with the interlibrary loan service, and stuffing filing cabinets with reams of photocopies. William Cronon, observing these and similar changes, notes: "None of us really has a clue what that future looks like."[17] With this book, Canales offers one vision of that future, in which the new capabilities that come with source digitization influence the substance of historians' questions and the texture of their answers.

Permit me an anecdotal illustration. A colleague of mine recently asked me what I knew about the origins of the hard science/soft science distinction, a topic that had arisen in one of her class discussions. The answer was not much. Not long ago, that might have been the end of it. With quick reference to digital sources, however, I was able to identify early uses "soft science" in the 1940s, where the term grew through a surprising dual use, as a funding category on one hand and a science fiction subgenre on the other. I could locate the likely origin of the term "hard

[17] Cronon (2012, January).

science" in Roger Ascham's sixteenth-century treatise *The Scholemaster*, about the education of wealthy scions. Ascham's often-quoted passage referring to "hie and hard sciences" ensured that "hard science" was firmly established well before the hard/soft dyad became prevalent in the 1940s.[18]

All the sources necessary for a preliminary response to my colleague's question are available in our university's library. But addressing it even superficially with any alacrity was only possible because of a suite of search tools and digitized texts. I do not mean to wax quixotic about Google Books and its brethren. Keyword searches are no substitute for genuine scholarship; the type of answers they provide are necessarily partial and frequently misleading. Nevertheless, they have a novel ability to *raise useful questions* because of the character of the access they provide. It is unlikely that I would have so easily wondered about the parallels between hard/soft science and hard/soft science fiction, or to dig as far back as the 1570s, without digital tools. The ability to directly compare a great diversity of sources—all of which were previously available—in a short span of time is a genuinely new capability with subtle, but sizable consequences for historical practice.

The juxtaposition of sources from distant intellectual siloes is precisely the strength of Canales's analysis. *The Physicist and the Philosopher* describes how now-familiar taxa of scholarly inquiry first differentiated: how the rift between analytic and continental philosophy grew and how science and philosophy became established as separate, sometimes antagonistic professions. It is a story that likely could not have been told even ten years ago. In principle, nothing prevented historians from accessing Canales's sources and noticing their significance to one another earlier. In practice, however, it is nearly inconceivable that anyone could have drawn all the interdisciplinary and international connections this book makes, against such a rich contextual backdrop, before widespread source digitization and electronic cataloging. I do not presume to know precisely how the author assembled her materials—a feature of historical practice that citation conventions render opaque—but the conspicuous alignment between opportunities created by digital organization of sources and Canales's historical perspective offers an opportunity to comment on issues made immediate by rapid changes in our own technological context.

When considering changes in practice, historians of science have given sustained attention to two related issues, often in conjunction. First, studying the large, complex scientific

[18] Ascham (1870), p. 32.

communities that emerged in the twentieth century presents gnarly problems of scale. As David Kaiser observes, methods optimized for detailed case studies rooted in archival sources "seem to be no match for the brute fact of exponential growth" of twentieth-century scientific workforces.[19] Second, digital history methods present both the potential for new modes of inquiry and the challenge of working out fresh standards to govern them.

Proposed responses to these issues include reimagining historical labor in a manner analogous to mid-twentieth century changes in scientific labor. Babak Ashrafi, acknowledging that humanists tend to be "determined individualists," suggests that embracing the collaborative spirit is one way for historians to manage the complexities of large, collaborative scientific communities.[20] *Out of the Crystal Maze*, a history of solid state physics—itself a large, unfocused field—that resulted from a long-term international collaboration, epitomized this style of "big history."[21] That this remains the exemplar after more than two decades, however, indicates the resilience of humanistic individualism. Although collaborations might now be a more realistic option for historians, they have not become the norm.

Another family of responses focuses on how digital tools can inform historical methodology. These proposals range from the modest to the elaborate. Kaiser suggests that historians can manage complex historical problems by using simple quantitative approaches to supplement archival and textual study. Examining the raw quantity of physics PhDs awarded in the United States in the twentieth century, for instance, reveals a boom-and-bust cycle that implies consequences for the way physics was practiced at various stages of the cycle.[22] At the more ambitious end of the spectrum, the Embryo Project at Arizona State University develops intricate web-based tools that aim to enrich historical analyses by characterizing community structures and collaborations, and to allow scientists to frame their research using historical perspectives.[23]

I sketch these examples as a foil. *The Physicist and the Philosopher* is a null case with respect to all of them. Canales is the lone author and shows no sign of using digital methods, simple or sophisticated, to assess her sources. Even so, the features discussed above—the thickness of the

[19] Kaiser (2012), p. 276.
[20] Ashrafi (2007), p. 9.
[21] Hoddeson, et al. (1992).
[22] Kaiser (2012).
[23] Maienschein & Laubichler (2010).

background description, the diversity of the source base, the illuminating boundary crossing—exhibit features attributable to a shifting technological context. The manner in which historians interpret primary documents has not substantially altered, but support structures that enable those interpretations has. Changes in the scaffolding that helps historians build their arguments implies changes the form of those arguments. The implication is that the substance of historical work and the standards used to evaluate it are likely to change even in the most conservative vision of how digital technologies will alter the historian's craft.

As of now, the growing network of cataloguing services, digitized sources, and keyword-searchable databases represents the possibility of consulting a wider array of sources in order to tell a story that cuts across specializations and speaks to large-scale historical themes. Although a possibility now, it bespeaks a coming necessity. For some time, historians of science have called for scholarship to move beyond close micro-historical analysis and address thematic elements common to many sciences or historical processes.[24] Easy access to sources from around the world, crosscutting disciplines, nations, and languages, makes this demand ever the more reasonable. It is easy to imagine how the type of linkages Canales uses to find a new angle on a well-known story could become the norm in historical exposition. Incremental changes to the process of source access, although they appear tame in comparison to the ways digital technologies can alter or supplement interpretive methods, might have the more pervasive effect on the discipline.

Some qualifications are in order. Canales, writing about Einstein and his contemporaries, moves over well-trodden ground and investigates a context that does not exhibit the scale effects Kaiser identifies. But beyond the peculiarities of this topic, the issue remains that historians' practices have already subtly changed in the ways we interact with our materials and therefore in the way we frame questions and develop answers to them. These changes, quite apart from the more radical possibilities offered by new forms of evidence or modes of interpretation, raise questions that demand further consideration. Do new technologies create a need for greater transparency in how we locate and access sources? How does easy access to a wider array of sources change our expectations for scholarly due diligence?[25] We have historically trusted professional librarians and archivists to maintain and curate the documents we need. Are we prepared to cede

[24] See: Kaiser (2005); Kohler (2005); Kohler & Olesko (2012).
[25] See Rekdal (2014).

that responsibility to algorithms? Will corporate hold over access to primary sources undermine the democratic potential of the Internet the same way some worry that it has with secondary sources?[26] It is beyond the scope of this review—and the ken of this reviewer—to attempt answers here, but these issues are current, pressing, and demand attention whether or not we embrace the promises and repercussions of full-blooded digital history.

5. Conclusion

Taken as a whole, *The Physicist and the Philosopher* chronicles the growth of deep and abiding rifts among Western intelligentsia. The Einstein-Bergson debate presaged the schism between continental and analytic approaches to philosophy. It unfolded amid the political disquiet of interwar Europe and the technologies that suffused it. Most critically, it exposed the rift between science and philosophy, both as professions and as sources of cultural authority, the battle for which science was beginning to win. The book closes with a postscript nodding to recent skirmishes over similar turf. The so-called "science wars" of the 1990s saw attempts from the heirs of Bergson's philosophical tradition to wrest from science some of the influence it had begun to amass in Einstein's day, and which, during the Cold War, had been deployed in service of the national security state in the United States.[27] Some scientists, perceiving the philosophers involved as speaking out of turn, responded combatively.[28]

The echoes of these disputes continue to reverberate, pushing science and philosophy farther apart. Steven Weinberg, the public face of American high energy physics, is famously hostile to philosophy.[29] He recently drew the ire of historians as well by dismissing long-accepted admonitions to consider historical events and actors within the contexts provided by their own values and assumptions with a curt, "I don't buy it."[30] Stephen Hawking, perhaps the most iconic physicist since Einstein himself, is no more accommodating of humanistic incursions into scientific turf, and has irked philosophers as a result.[31] Neil deGrasse Tyson, among today's most

[26] On this last question, see Alberti (2010, June) and Cronon (2012, January).
[27] Bridger (2015).
[28] E.g., Sokal (1998).
[29] Weinberg (1992).
[30] Weinberg (2015), p. 29; Pesic (2015).
[31] Hawking and Mlodinow (2010); Norris (2011).

potent science communicators, considers philosophy obsolete in the face of scientific advance.[32] Amid widespread concern about the future of the humanities in an increasingly market-driven academy, understanding the historical origins of these sentiments becomes all the more essential. *The Physicist and the Philosopher* should be read in light of persistent questions about disciplinary and cultural values. The philosopher might have ended up on the wrong side of his squabble with the physicist, but his insistence that Einstein's view of time rested on deep metaphysical assumptions that did not follow unproblematically from the architecture of his theory reflects an unresolved point of contention between physicists and philosophers in particular, and science and the humanities in general.

When combined with its significance for historical practice, this book's relevance for current professional issues makes it worthy of careful attention, even when at its most confounding. As the title of this review suggests, Canales's telling of the story portends "new straw for the old broom."[33] The way she wields the tools of the trade suggests nothing unorthodox, but where the bristles of the besom meet the hardwood of history, changes in audiences and access technologies make for a narrative that is new in ways that speak to the identity of history and philosophy of science and, for better or ill, hint at features of its future.

Acknowledgments

Thanks to Margaret Charleroy, Richard Oosterhoff, and an anonymous reviewer for helpful commentary.

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[32] Pigliucci (2014).

[33] I have cribbed this phrase from Darnielle (2005).

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